



PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Goretta, et al.  
Title: "JOINING OF ADVANCED MATERIALS BY PLASTIC DEFORMATION"  
Serial No.: 09/924,571  
Filing Date: August 7, 2001  
Art Unit: 1725  
Examiner: Len Tran  
Attny Docket. 0003/00950

CERTIFICATE OF MAILING: I hereby certify that this correspondence is being deposited with the United States Postal service as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C., 20231 on January 5, 2003 (Date of Deposit)

Kimwanza Buford

Name of Representative

Signature

Date of Signature

Assistant Commissioner for Patents  
Washington, D.C. 20231

20 N. Wacker Drive  
Chicago, IL 60606  
312-621-1330

**AMENDMENT-REMARKS**

Dear Sir:

In response to the September 03, 2003 Official Action in the above-identified matter, please enter the accompanying amendment and consider the following remarks.

Claims 7-13 and 25 are rejected under 35 U.S.C. 102 (e) as being anticipated by Xue et al (U.S. 6,174,605). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xue. Applicants submit that in light of the current amendment to independent claim 7, whereby a superplastic process is recited, Xue is not applicable.

Xue teaches away from superplastic deformation processes, such as that now claimed. In fact, the Background section of Xue cites the drawbacks of diffusion

bonding, to wit:

“Available joining methods are limited to bonding with adhesive materials, alloy brazing, diffusion bonding, and welding....Diffusion bonding using refractory metals or compounds usually requires quite careful joining surface preparation of essentially porosity free carbons as well as long heating times at very high temperatures (oven > 200 C°) under high pressures. Column 1, lines 25 and 30-34.

The fact that Xue makes no mention of *relative* particle sizes between its joint compound and the objects to be joined (contrary to that claimed in instant claim 7) further evidences that Xue does not deal with super plastic deformation.

Rather, and as is clear through the Xue patent, Xue requires reactive bonding to form its constructs. Xue's Abstract states that “A *reactive-bonding joint interlayer* having thickness greater than 1 mil is formed of fine particles of carbide-forming metallic ingredients and carbon” (Emphasis mine).

Further, Xue's joint compound contains carbon, as it must, so as to *react* with the carbon parts it joins together. Also, Xue's use of carbon fibers up to 5 millimeters long in its joint compounds (Column 3, line 66) and joint particle sizes up to 100 microns prevents any boundary sliding from occurring.

In summary, Xue relies on reactivity, not diffusion, to create its constructs as further explained in the accompanying 1.132 Affidavit (Attachment A) by co-inventor Jules Routbort.

This contrasts with the instant method's current recitation wherein superplastic deformation occurs between the objects and the joint compound. Support for this new limitation is found throughout the application, and specifically on page 10, lines 26-30 and page 11, lines 2-8.

As explained in the Affidavit, superplasticity is a diffusion-controlled process. Specifically, the seamless bonding provided by the instant method is the result of grain boundary sliding, as stated on page 8, lines 15-16 and page 9, lines 20-25 of the instant specification.

Diffusion bonding, which Xue is seeking an alternative to, occurs hand-in-hand with superplastic deformation. See for example the primer entitled "Integral Construction by Superplastic Forming with Diffusion Bonding" (Attachment B hereto), produced by Form Tech GmbH of Weyhe-Dreye, Germany. Superplastic Forming with Diffusion Bonding is now known in the industry as SPF/DB technology and is "a method for economic manufacture of three-dimensional objects and sandwich structures." (See the FormTech Attachment B).


In summary, Xue does not anticipate or suggest relative particle sizes of its joint compounds and the objects it is joining. Further, Xue neither anticipates nor suggests superplastic deformation. In fact, Xue espouses its invention as an alternative to such diffusion processes.

In light of the instant amendment, and the foregoing remarks, Applicants request that the §102 and §103 rejections based on Xue be withdrawn and that claims 7-13, 25, and 26 be allowed.

An earnest attempt has been made to respond to the September 3, 2003 Official Action in this matter. All claims are deemed in condition for allowance. If the Examiner feels that a telephonic interview with expedite allowance, he is respectfully urged to contact the undersigned. Claims 7-13, 25, and 26 are pending in the application. Allowance of these claims is hereby requested.

Respectfully solicited,

**CHERSKOV & FLAYNIK**

BY 

Michael J. Cherskov (Reg. No. 33,664)